(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
18 October 2001 (18.10.2001)

PCT

(10) International Publication Number
WO 01/76382 A1

(51) International Patent Classification[7]: A23F 3/30

(21) International Application Number: PCT/KR01/00463

(22) International Filing Date: 22 March 2001 (22.03.2001)

(25) Filing Language: Korean

(26) Publication Language: English

(30) Priority Data:
2000/0014644 22 March 2000 (22.03.2000) KR

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(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

Published:
— *with international search report*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

WO 01/76382 A1

(54) Title: METHOD OF EXTRACTING THE STAPLE INGREDIENTS FROM *CAMELLIA SINENSIS* INCLUDING POLYPHENOLS, AND THE MEDICINE FOR DIABETES, HYPERLIPEMIA, HYPERCHOLESTERINEMIA, OBESITY AND HYPERTENSION HAVING THE EXTRACT OF *CAMELLIA SINESIS* AS PRINCIPAL COMPONENTS

(57) Abstract: The present invention provides a method of extracting staple ingredients including Polyphenols from Camellia sinensis comprising the steps of: boiling Camellia sinensis with wate under 60-100 °C for about 15-60 minutes; cooling to about 4 °C and filtering to remove the dregs from the extract; drying to solidify the extract and grounding the solified extract; and adding organic solvent to solve and remove the organic material remained in the extract. The extract of Camellia sinensis produced by the method of the present invention has prominent curing effect in connection with diabetes, hyperlipemia, hypercholesterinemia, obesity and hypertension.

METHOD OF EXTRACTING THE STAPLE INGREDIENTS FROM *CAMELLIA SINENSIS* INCLUDING POLYPHENOLS, AND THE MEDICINE FOR DIABETES, HYPERLIPEMIA, HYPERCHOLESTERINEMIA, OBESITY AND HYPERTENSION HAVING THE EXTRACT OF *CAMELLIA SINENSIS* AS PRINCIPAL COMPONENTS

TECHNICAL FIELD

The present invention is directed to a method for extracting staple components including polyphenols from *Camellia sinensis*, and medicines containing the extract from *Camellia sinensis* as active ingredients for treating diabetes, hyperlipemia, hypercholesterinemia, obesity and hypertension.

PRIOR ART

With a considerable advance in the standard of living, people have overeaten or faultily utilized fast foods while also having suffered from various adult diseases which have been conventionally rare. Representative adult diseases include diabetes, hyperlipemia, hypercholesterinemia, hypertension and so on, which are caused by or frequently associated with obesity.

Therapeutic medicines for treating diabetes are classified into two types, that is, those increasing internal use of sugar, and those decreasing absorption of sugar. Nowadays, Acarbose is commonly used in the treatment of diabetes, and is a medicine for decreasing absorption of sugar.

Starch ingested to the human body is decomposed by amylase secreted from the pancreas to disaccharides or trisaccharides, which are then decomposed to glucose, which is a monosaccharide, by alpha-glycosidase secreted from the small intestine. The body absorbs not starch or disaccharides or trisaccharides decomposed by amylase, but monosaccharides decomposed by alpha-glycosidase. Acarbose, a commercially available medicine of diabetes, is responsible for

inhibiting the function of alpha-glycosidase which is an enzyme hydrolyzing disaccharides or trisaccharides, thereby decreasing the absorption of sugar.

However, when Acarbose, inhibiting hydrolysis of disaccharides or trisaccharides is taken internally, the concentration of disaccharides or trisaccharides is increased in the intestines because disaccharides or trisaccharides are not discharged from the body and are accumulated in the intestines. If that happens, osmotic pressure in the intestines is increased and thus diarrhoea may be caused, and also gas is generated with decomposing disaccharides or trisaccharides by bacteria in the intestines, so side-effects occurring caused by toxicity of the generated gas.

Starch itself is not absorbed to the body and also the not-decomposed starch is easily discharged from the body. Hence, if starch is not decomposed to disaccharides or trisaccharides by amylase, it is readily discharged from the body, so side-effects attributed to increase of the concentration of disaccharides or trisaccharides in the body (according to internal use of Acarbose) being removed. However, amylase inhibitors are not produced on a commercial scale up to now, so that therapeutic medicines of diabetes go with the side-effects as described above.

Meanwhile, blood lipid components such as cholesterols and neutral fats are in the form of water-soluble lipoproteins in the blood. Hyperlipemia is a condition of high blood concentration of lipid components which is caused by abnormal lipoprotein metabolism in the body. When a state of hyperlipemia continues for a long term, cholesterol and the like tend to deposit onto artery walls, and thus cause coronary arteriosclerosis. Lipoprotein metabolism in the body is carried out by lipase, an enzyme secreted from the duodenum after production in the spleen. Lipid components in foods are mostly neutral fats, which are decomposed to fatty acids and glycerin by lipase. Neutral fats are not directly decomposed in the digestive organs by lipase, but decomposed by lipase-mediated hydrolysis after water-insoluble neutral fats are changed to water-soluble forms by salts of various organic acids in the bile.

If the function of lipase, that is, the decomposition of neutral fats to fatty acid and glycerin were inhibited, the amount of fatty acids absorbed into the body would be decreased. So, the levels of blood fat, body fat and blood cholesterol

may be decreased, thus treating hyperlipemia. However, if neutral fats absorbed into the body are not decomposed, side-effects such as diarrhoea or abdominal pain are created. Because of said problems, lipase inhibitor cannot be produced in a commercial scale.

On the other hand, hypertension is classified into primary (i.e., essential) hypertension that cannot be attributed to any particular organic cause; and secondary hypertension having identifiable underlying causes such as kidney disease, change of great vessels, endocrine disease, other agitation and stress states. When diagnosing hypertension, if a cause of essential hypertension is identified, such hypertension is regarded as secondary hypertension. Commonly, therapeutic medicines of hypertension treat secondary hypertension.

Useful as the medicines to treat hypertension, use can be made of α-receptor blocker, antidiuretics, calcium channel blocker, angiotensin transposase blocker and the like. Of them, α-receptor blocker acts to inhibit an increase of blood pressure attributed to excessive secretion of norepinephrine. However, in the treatment of hypertension, most patients develop resistance to therapeutic medicine, so that treatment effect is considerably decreased over time. As well, because of complicated causes of the disease, for example, excess secretion of norepinephrine, excessive blood cholesterol and blood fat, and obesity, persons may suffer from hypertension. Such complicated causes cannot be alleviated by administrating only single medicines. There is thus a widely recognized need for development of medicines devoid of resistance-generation as well as being able to treat various causes of hypertension. However, such medicines have not been developed yet.

Green tea (*Camellia sinensis*) has been widely consumed in parts of the Orient since before the Han dynasty of China, and by great numbers of the world's people since the 19th century. Recently, green tea is known to have therapeutic effects for adult diseases, including diabetes, hyperlipemia, or hypertension, but a therapeutic mechanism of *Camellia sinensis* has not been scientifically revealed. So, the effect of green tea is just recognized to a folk remedy, and the treatment of adult diseases by use of *Camellia sinensis* has not been considered in modern medical science.

DISCLOSURE OF THE INVENTION

Leading to the present invention, the intensive and thorough research on a method for extracting staple components, including polyphenols, from *Camellia sinensis*, and therapeutic effects of the extract for adult diseases including diabetes, hyperlipemia, hypercholesterinemia, hypertension or obesity by variously testing the extract using the mouse model, carried out by the present inventors aiming to avoid the problems encountered in the prior arts, resulted in the finding that the extract from *Camellia sinensis* can treat diabetes by having excellent blood sugar decrease effect with significant alleviation of side-effects that commercially available Acarbose has; hyperlipemia and hypercholesterinemia by inhibiting the function of lipase without side-effects; hypertension by functioning as an α-receptor blocker in addition to intervening in various causes; and obesity by overcoming various causes of obesity.

Accordingly, it is an object of the present invention to provide medicines containing the extract from *Camellia sinensis* as active ingredients for treating diabetes, hyperlipemia, hypercholesterinemia, obesity and hypertension, without a need of conventional appetite inhibitors for dietary restrictions for treating said diseases.

It is another object of the present invention to provide a method for effectively extracting staple components having said therapeutic effects from *Camellia sinensis*.

In accordance with the present invention, there is provided a method for extracting staple components including polyphenols from *Camellia sinensis*, comprising boiling 1 part by weight of dried *Camellia sinensis* with 5-20 parts by weight of water at 60-110 °C for 15 minutes to 1 hour; cooling the filtered liquid to about 4 °C, and filtering off the dregs or precipitants from *Camellia sinensis*; evaporating off the filtered liquid phase, followed by powdering the resultant solid; and adding the powdered solid with an organic solvent, to remove organic matters contained in the phase extracted from *Camellia sinensis*.

BEST MODES FOR CARRYING OUT THE INVENTION

When *Camellia sinensis* (green tea) is prepared to drink, leaves of the tea are soaked in water at 60-80 °C for 3-5 minutes. However, long periods of time and high temperature conditions are required to separate and extract polyphenols, an active ingredient, from *Camellia sinensis*. Therefore, in the present invention, dried powders or fresh leaves of *Camellia sinensis* are boiled in hot water at 60-110 °C for 15 minutes or longer, and then the dregs or precipitants from *Camellia sinensis* are filtered off. Subsequently, the filtered liquid is cooled to 4 °C, to precipitate and filter off the dregs or precipitants dissolved in water at high temperature. Thusly obtained liquid phase extracted from *Camellia sinensis* is evaporated off and the remaining solid is pulverized, and added to an organic solvent, thus removing matters dissolvable in said organic solvent, contained in the extract from *Camellia sinensis*.

The extract from *Camellia sinensis* according to the method of the present invention is prepared in common medicine forms, and thus can be orally administered or injected. It is preferred that oral administration is carried out in the dosage form including, but being not limited to, solution, powder, capsule, tablet, syrup. The pharmaceutical preparations of the extract from *Camellia sinensis* which are extracted from natural foods have no toxicity for the human body. The amount of the pharmaceutical preparations actually administered ought to be determined in light of various relevant factors including the purpose of administration, the age, sex and body weight of the individual subject, and the severity of the subject's symptoms. In the case that the extract is a dried granule phase, daily doses range from hundreds of mg to ones of g, while in the case of liquid phase, daily doses range from ones of ml to hundreds of ml.

The extract from *Camellia sinensis* of the present invention can be used as a medicine for treating diabetes because of inhibiting the function of amylase which hydrolyzes starch to disaccharides or trisaccharides, without side-effects, such as diarrhoea or gas generation in the intestines caused by an increase of the

concentration of disaccharides or trisaccharides when Acarbose, a conventional medicine for treating diabetes, is used.

In addition, the extract from *Camellia sinensis* can be used as a medicine for treating hyperlipemia, hypercholesterinemia, and obesity, because of inhibiting the function of lipase which is a digestive enzyme at a step of decomposition of neutral fats to fatty acid, and thus having effects of decreasing the levels of body fat, blood cholesterol, and blood neutral fats by digestion and absorption of neutral fats.

Also, the extract from *Camellia sinensis* of the present invention has a function of α-receptor blocker and thus can simultaneously treat hyperlipemia, hypercholesterinemia, and obesity which are other causes of hypertension, thereby being used as a medicine for treating hypertension.

A better understanding of the present invention may be obtained in light of the following examples which are set forth to illustrate, but are not to be construed to limit the present invention.

EXAMPLE 1

The present experiment was carried out for extracting staple components from *Camellia sinensis*. 1 kg of hot air-dried powders of *Camellia sinensis* was added with 10 L of distilled water, and then heated to reflux at about 80 °C for 30 minutes, followed by filtering off the dregs of *Camellia sinensis*. The filtered liquid phase was allowed to stand at 4 °C for 1 hour, followed by suction-filtering the precipitants, to yield 8.5 L of extracted liquid. The extracted liquid (8.5 L) was spray-dried, after which the solidified extract was pulverized, thereby obtaining 230 g of powders extracted from *Camellia sinensis*, which was then added with ethyl ether (500 ml) and stirred for 30 minutes. So, organic components contained in the extract were dissolved in ether, and organic component-dissolved ether layer was removed.

Thusly obtained extract from *Camellia sinensis* (210 g) was dried and then pulverized, to yield 200 g of the extract (A) from *Camellia sinensis* of the present

invention. Component analysis results of such extract are shown in Table 1, below.

TABLE 1

Components	Contents (%)
Amino acids	11
Free sugars (maltose, sucrose, glucose)	12
Polyphenols	51
Caffeine	4
Inorganic ions (potassium, calcium, magnesium)	6
Balance	16

Upon analyzing said components in the present example, free amino acid was measured at 570 nm by ninhydrine color development; free sugar and caffeine were measured by HPLC method; inorganic ions by molecular absorption spectrophometry; polyphenols by spectrophotometric redox assay method using Prussian blue; and blood biochemical components (glucose, BUN, creatine, sGOT, sGPT, alkaline phosphatase) were measured by blood biochemical analytical equipment.

As can be seen from the results, staple components extracted from *Camellia sinensis* of the present invention are found to largely comprise polyphenols, which mainly mediate the therapeutic effects of the extract from *Camellia sinensis*.

EXAMPLE 2

The present experiment was performed to determine the amylase inhibition effect of the extract from *Camellia sinensis*, that is to say, amylase inhibition effect versus starch, maltose and glucose.

A. Starch loading experiment

Sprague-Dawley male white mice, weighing 220-250 g, were fasted for 12 hours, after which three groups of 5 mice were classified into groups of control, starch administration and simultaneous administration of starch and extract from *Camellia sinensis*. The control group was administered with tap water (3 ml), the starch administration group with starch (1 g) and tap water (3 ml), and the simultaneous administration group with a mixture of starch (1 g), tap water (3 ml) and the extract (A) (60 mg) from *Camellia sinensis* prepared in the above example 1. After 40 minutes, blood from the incised tails was sampled to measure blood sugar levels. The results are given in the following Table 2.

TABLE 2

Groups	Blood Sugar Level (mg/100ml)	
	0 min.	After 40 min.
Control	71.5 ± 5.3	72.2 ± 6.7
Starch admin.	71.1 ± 7.3	120.5 ± 15.3
Starch + Extract admin.	70.5 ± 4.2	85.7 ± 7.7

(numeral value = mean ± standard deviation)

B. Maltose loading experiment

Sprague-Dawley male white mice, weighing 220-250 g, were fasted for 12 hours, after which three groups of 5 mice were classified into groups of control, maltose administration and simultaneous administration of maltose and extract

from *Camellia sinensis*. The control group was administered with tap water (3 ml), the maltose administration group with maltose (1 g) and tap water (3 ml), and the simultaneous administration group with a mixture of maltose (1 g), tap water (3 ml) and the extract (A) (60 mg) from *Camellia sinensis* prepared in the above example 1. After 40 minutes, blood from the incised tails was sampled to measure blood sugar levels. The results are given in Table 3, below.

TABLE 3

Groups	Blood Sugar Level (mg/100ml)	
	0 min.	After 40 min.
Control	72.3 ± 4.5	72.2 ± 5.4
Maltose admin.	70.2 ± 4.3	117.9 ± 13.5
Maltose + Extract admin.	71.2 ± 5.4	121.9 ± 10.5

(numeral value = mean ± standard deviation)

C. Glucose loading experiment

Sprague-Dawley male white mice, weighing 220-250 g, were fasted for 12 hours, after which three groups of 5 mice were classified into groups of control, glucose administration and simultaneous administration of glucose and extract from *Camellia sinensis*. The control group was administered with tap water (3 ml), the glucose administration group with glucose (1 g) and tap water (3 ml), and the simultaneous administration group with a mixture of glucose (1 g), tap water (3 ml) and the extract (A) (60 mg) from *Camellia sinensis* prepared in the above example 1. After 40 minutes, blood from the incised tails was sampled to measure blood sugar levels. The results are given in Table 4, below.

TABLE 4

Groups	Blood Sugar Level (mg/100ml)	
	0 min.	After 40 min.
Control	72.1 ± 4.7	71.7 ± 3.7
Glucose admin.	71.8 ± 6.1	121.5 ± 12.1
Glucose + Extract admin.	72.5 ± 5.3	126.6 ± 17.1

(numeral value = mean ± standard deviation)

EXAMPLE 3

The present experiment was carried out to determine blood sugar-decreasing effect of the extract from *Camellia sinensis* in the mice suffering from diabetes. Sprague-Dawley male white mice, weighing 220-250 g, were fasted for 12 hours, after which a solution of alloxan in physiological saline was injected to the mice in an amount of 80 mg per 1 kg body weight to cause diabetes. Two groups of 5 diabetes-induced mice were classified into groups of control, and administration of the extract from *Camellia sinensis*. The control group was fed with normal feed, and the administration group of the extract from *Camellia sinensis* was supplied with a combination of the extract (A)(40 g) and feed (1 kg). At predetermined time intervals, blood from the incised tails of the mice belonging to each group was sampled, thus measuring blood sugar levels. The results are given in Table 5, below.

TABLE 5

Time (day)	Blood Sugar Level (mg/100ml)	
	Normal feed	*Camellia sinensis* extract-added feed
0	437 ± 24.5	436 ± 22.3
1	440 ± 27.4	350 ± 26.4
2	445 ± 25.5	150 ± 20.4
3	437 ± 34.6	130 ± 15.7
7	450 ± 27.5	140 ± 16.4
14	447 ± 32.3	137 ± 15.5

(numeral value = mean ± standard deviation)

EXAMPLE 4

To investigate blood sugar reducing effect of the extract from *Camellia sinensis* of the present invention, 10 persons having fasting blood sugar levels of 200-250 mg/100 ml were measured for their blood sugar levels. The subjects were administered with the extract from *Camellia sinensis* (A) prepared in the above example 1 in the amount of 1 g with every meal (three times daily) for four weeks. Two hours before and after meals, blood sugar levels were measured at one week intervals for five weeks. The results are presented in the following Table 6.

TABLE 6

Time (day)	Change of Blood Sugar Level (mg/100ml)	
	2 h after meals	Fasting
7	62 ± 14	85 ± 12
14	64 ± 17	57 ± 16
21	75 ± 25	65 ± 20
28	67 ± 14	62 ± 17
35	70 ± 19	60 ± 16

(numeral value = mean ± standard deviation)

EXAMPLE 5

To investigate neutral fat reducing effect of the extract from *Camellia sinensis* of the present invention, 10 persons having blood neutral fat levels of 200-300 mg/100 ml were measured for their neutral fats. The subjects were administered with the extract from *Camellia sinensis* (A) prepared in the above example 1 in the amount of 750 mg with every meal (three times daily) for four weeks. Before meals, the levels of the neutral fats were measured at one week intervals for four weeks. The results are presented in the following Table 7.

TABLE 7

Time (day)	Change of Neutral Fat Level (mg/100ml)
7	60 ± 19
14	67 ± 10
21	76 ± 11
28	65 ± 16

(numeral value = mean ± standard deviation)

EXAMPLE 6

To investigate cholesterol reducing effect of the extract from *Camellia sinensis* of the present invention, 10 persons having blood cholesterol levels of 260-350 mg/100 ml were measured for their blood cholesterol level. The subjects were administered with the extract from *Camellia sinensis* (A) prepared in the above example 1 in the amount of 750 mg with every meal (three times daily) for four weeks. Before meals, the level of cholesterol from the sampled blood was measured at one week intervals for six weeks. The results are shown in Table 8, below.

TABLE 8

Time (day)	Decrease of Cholesterol Level (mg/100ml)
7	10 ± 3
14	25 ± 5
21	37 ± 8
28	54 ± 9
35	59 ± 9
42	65 ± 11

(numeral value = mean ± standard deviation)

EXAMPLE 7

To investigate blood pressure reducing effect of the extract from *Camellia sinensis* of the present invention, arterial blood pressure was measured. Sprague-Dawley male white mice weighing 290-320 g were fasted for 12 hours, after which three groups was administered with only extract from *Camellia sinensis* (20 μg or 40 μg/kg body weight), only norepinephrine (1 μg/kg body weight), and a

combination of extract from *Camellia sinensis* (20 μg or 40 μg/kg body weight) and norepinephrine (1 μg/kg body weight).

Intraperitoneal injection of pentobarbital-Na at 40 mg/kg was carried out to anesthetize the mice, after which a cannular was inserted into the carotid artery and thus blood pressure was measured by use of a physiological measuring instrument. The extract from *Camellia sinensis* and the norepinephrine were administered via a cannular inserted into femur vein. After 30 minutes, blood pressure was measured. The results are given in the following Table 9.

TABLE 9

Groups		Average Blood Pressure change(mmHg)
Extract from *Camellia sinensis* admin.		1.5 ± 0.5
Norepinephrine admin.		38.2 ± 2.1
norepinephrine admin. after admin. of Extract from *Camellia sinensis*	Extract 20 μg	10.1 ± 1.1
	Extract 40 μg	4.2 ± 0.8

Average blood pressure before admin. : 119 ± 17㎜Hg

(numeral value = mean ± standard error, individual No.=7)

EXAMPLE 8

The present experiment was performed to investigate blood pressure reducing effect of the extract from *Camellia sinensis* of the present invention. 10 persons having systolic pressure of 170 mmHg and diastolic pressure of 95 mmHg (age: 34-62) were measured for their blood pressure. The subjects were administered with the extract from *Camellia sinensis* (A) prepared in the above example 1 in the amount of 700 mg with every meal (three times daily) for eight

weeks. Blood pressure was measured at one week intervals. The results are shown in Table 10, below.

TABLE 10

Time (week)	Blood Pressure (mmHg)	
	Systolic pressure	Diastolic pressure
Before admin.	165 ± 10	101 ± 5
1 week after admin. of Extract from *Camellia sinensis*	155 ± 8	95 ± 4
2 week	148 ± 9	90 ± 3
3 week	142 ± 7	87 ± 4
4 week	139 ± 6	86 ± 3
5 week	135 ± 9	85 ± 4
6 week	131 ± 7	85 ± 4
7 week	128 ± 6	84 ± 3
8 week	128 ± 7	84 ± 4

(numeral value = mean ± standard error)

EXAMPLE 9

The present experiment was performed to investigate body weight reduction effect (obesity treatment) of the extract from *Camellia sinensis* of the present invention. 10 persons determined to be obese were measured for their body weights. The subjects were administered with the extract from *Camellia sinensis* (A) prepared in the above example 1 in the amount of 1 g with every meal (three times daily) for four weeks. The body weight was measured every week,

and the levels of blood sugar and neutral fats in serum from the sampled blood were measured at two-week intervals. The results are shown in Table 11, below.

TABLE 11

	Start	1 week	2 week	3 week	4 week
Change of Body weight (kg)	0	-0.5	-1.5	-2.0	-2.5
Change of Blood Sugar Level (mg/100 ml)	0		-2		-3
Change of Neutral Fat Level (mg/100 ml)	0		-35		-45

(numeral value = mean)

EXAMPLE 10

The liver and kidney toxicity test of the extract from *Camellia sinensis* of the present invention was performed. Sprague-Dawley male white mice weighing 220-250 g were fasted for 12 hours, after which two groups of 10 mice were classified into control and administration of the extract from *Camellia sinensis*. The groups of control and administration of the extract from *Camellia sinensis* were orally administered with tap water (2 ml), and the solution of the extract (A) (100 mg) prepared in the above example 1 in tap water (2 ml), respectively. After one day, the white mice were killed, and blood sugar, BUN, sGOT, sGPT, alkaline phosphatase and creatinine from the blood of abdominal artery were measured. The results are given in the following Table 12.

TABLE 12

	Control	Extract from *Camellia sinensis* admin.
Glucose(mg/100ml)	98 ± 11	95 ± 8
BUN(mg/100ml)	21 ± 7	19 ± 6
Creatinine(mg/100ml)	1.2 ± 0.1	1.1 ± 0.1
SGOT(U/L)	58 ± 11	59 ± 8
SGPT(U/L)	65 ± 9	67 ± 18
Alkaline phosphatase(U/L)	125 ± 32	126 ± 45

(numeral value = mean ± standard deviation)

INDUSTRIAL APPLICABILITY

As described above, the extract from *Camellia sinensis* of the present invention inhibits the function of amylase which mediates the hydrolysis of starch to disaccharides or trisaccharides, so that absorption of starch can be inhibited and blood sugar level of patients suffering from diabetes can be decreased, thus medicines containing the extract from *Camellia sinensis* as an active ingredient being used in treating diabetes.

In addition, the extract from *Camellia sinensis* of the present invention decreases the levels of blood neutral fats and blood cholestrol, and thus medicines containing the extract as an active ingredient can treat hyperlipemia and hypercholesterinemia and can be used in control of body wieght, and prevention and treatment of obesity by lowering body fat.

The extract from *Camellia sinensis* of the present invention have therapeutic effects alleviating various causes of hypertension, so medicines

containing the extract as an active ingredient being able to be used in treatment of hypertension.

As well, the method for removing unnecessary components and extracting staple components from *Camellia sinensis* of the present invention is advantageous in light of simple manner, and high efficiency.

The present invention has been described in an illustrative manner, and it is to be understood that the terminology used is intended to be in the nature of description rather than of limitation. Many modifications and variations of the present invention are possible in light of the above teachings. Therefore, it is to be understood that within the scope of the appended claims, the invention may be practiced otherwise than as specifically described.

CLAIMS

1. A method for extracting staple components including polyphenols from *Camellia sinensis*, comprising the following steps of:

boiling 1 part by weight of dried *Camellia sinensis* with 5-20 parts by weight of water at 60-110 °C for 15 minutes to 1 hour;

cooling the liquid obtained in the prior step to about 4 °C, and filtering off the dregs or precipitants from *Camellia sinensis*;

evaporating off the filtered liquid phase, followed by powdering the resultant solid; and

adding the powdered solid with an organic solvent, to remove organic matters contained in the phase extracted from *Camellia sinensis*.

2. The method as defined in claim 1, further comprising the step of evaporating the liquid organic phase and powdering the resultant solid, after said adding step.

3. A therapeutic medicine for treating diabetes, containing the extract from *Camellia sinensis* extracted by the method of claim 1 or 2 as an active ingredient.

4. A therapeutic medicine for treating hyperlipemia, containing the extract from *Camellia sinensis* extracted by the method of claim 1 or 2 as an active ingredient.

5. A therapeutic medicine for treating hypercholesterinemia, containing the extract from *Camellia sinensis* extracted by the method of claim 1 or 2 as an active ingredient.

6. A therapeutic medicine for treating obesity, containing the extract from *Camellia sinensis* extracted by the method of claim 1 or 2 as an active ingredient.

7. A therapeutic medicine for treating hypertension, containing the extract from *Camellia sinensis* extracted by the method of claim 1 or 2 as an active ingredient.

INTERNATIONAL SEARCH REPORT

International application No.
PCT/KR01/00463

A. CLASSIFICATION OF SUBJECT MATTER

IPC7 A23F 3/30

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimun documentation searched (classification system followed by classification symbols)

IPC7 A23F 3/00, A23F 3/16, A23L 2/38, A61K 35/78

Documentation searched other than minimun documentation to the extent that such documents are included in the fileds searched

Korean Patents and applications for inventions since 1975

Electronic data base consulted during the intertnational search (name of data base and, where practicable, search trerms used)

NPS, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	KR 96-10608 B (PARK M.K.) 06. August 1996 See the whole document	1-7
Y	KR 98-72441 A (SON K.S.) 05. November 1998 See the whole document	1-7
A	KR 97-5233 B (HAN D.K.) 14. April 1997 See the whole document	1-7
A	KR 97-150703 B (LEE N.H.) 16. June 1998 See the whole document	1-7
A	KR 98-73989 A (KIM D.T.) 05. November 1998 See the whole document	1-7

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Date of the actual completion of the international search	Date of mailing of the international search report
20 JUNE 2001 (20.06.2001)	21 JUNE 2001 (21.06.2001)

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/KR01/00463

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
KR 96-10608 B	06. 08. 1996	NONE	
KR 98-72441 A	05. 11. 1998	NONE	
KR 97-5233 B	14. 04. 1997	NONE	
KR 97-150703 B	16. 06. 1998	NONE	
KR 98-73989 A	05. 11. 1998	NONE	